

## Illustrating actual customer benefits from Bently Nevada products

**T**he following actual incidents briefly illustrate some of the benefits customers have received by using Bently Nevada products in a variety of applications.

■ A refinery recently reported that a 7200 Thrust Monitor at their plant started to show significant axial movement of the rotor in their steam turbine. The plant's Reliability Engineer, based on his previous experience with the rotor and his faith in the accuracy of Bently Nevada's monitoring equipment, shut the machine down. After the rotor was backwashed, thrust readings dropped to normal. The consensus was that the movement had been caused by machine fouling. The unit was returned to service with a normal thrust reading and increased efficiency.

■ During a recent on-site seminar at a power plant, management expressed their appreciation of a 3300 Monitoring System that enables them to keep their main turbine running longer. The plant has a system that consists of 3300/61 Dual Vector Monitors and a Transient Data Manager® System. Proximity probes mounted 90 degrees apart are located at each bearing of the machine train. The Dual Vector Monitors indirectly enabled the customer to discover shorted stator windings within the generator. The vibration levels on the generator bearings increased as megawatts increased. It was determined that, with the increase in load and the need to increase VARS, more current passed through the shorted windings of the stator, which in turn caused a segment of the generator to

"heat up." This "heat up" of the rotor caused a temporary thermal bow of the rotor. The result of the bow was an increase in the vibration level at the generator bearings. This information was used to discover shorted windings on their generator by correlating vibration with a change in megawatts.

■ A chemical plant had a machine save on a 15 MW turbine generator which was monitored by a newly-installed 3300 Monitoring System. The generator normally operates with vibration levels under 3 mils. When alarms were activated at 5 mils, the generator was opened. Bearing No. 2 was wiped and water was found in the oil, which was traced to a leaking steam seal. Repair costs and downtime was minimized as a result of the information they received from their 3300 Monitoring System. They feel this one save has more than paid for the cost of the monitoring system.

■ A 3300/80 Six-channel Rod Drop Monitor detected excessive rider band wear on a cylinder at a refinery. A check of the cylinder showed only 5-6 mils of rider band was left. The rider band was quickly replaced, averting a major repair job.

■ Over a two month period, a power plant noticed a steady increase in vibration on their Forced Draft fan motor. The fan was monitored by a 3300 Monitoring System with the analog outputs connected to a Distributed Control System. The fan was checked during the next scheduled outage. The fan's foundation bolts had come loose, and the fan was out of balance due to build-up on the blades. The bolts were

tightened, and the fan was rebalanced and started without curtailing power production. Vibration levels returned to normal as a result of these changes. It is difficult to determine how much money was saved by this machine save, but a similar fan problem two years earlier, at another plant owned by this power company, cost over \$1,000,000.

■ A Data Manager System was instrumental in a machine save on a steam turbine-driven plant air compressor at an oil refinery. The turbine was uncoupled from the compressor to do a yearly overspeed trip test. After testing and putting the machine back in service, the vibration levels on the turbine inboard bearing exceeded Alert levels. The setpoint was raised. Over the next two days, the vibration levels nearly tripled, compared to levels before testing, and again exceeded Alert levels. Based on the alarms and the Trend plots from the Data Manager, the machine was shut down. Inspection of the match marks on the coupling revealed the coupling had been improperly installed.

■ A petrochemical plant uses 7200 Series Monitoring Systems on its two large Hyper Compressor trains. The systems are wired to trip their machines upon a Danger alarm. One of the compressors tripped; inspection showed a tie rod had loosened, causing a change in the alignment of the plunger. The plant's management is convinced the 7200 System prevented a catastrophic failure. This "save" easily justified adding monitoring to another machine. ■